

# **LOGAN MARTIN RESERVOIR MANAGEMENT REPORT**

FALL 2004

Prepared by

**Robert O. Andress**  
District Fisheries Biologist

**E. Daniel Catchings**  
District Fisheries Supervisor

**Kevin W. Baswell**  
District Biologist Aide

Department of Conservation and Natural Resources  
Wildlife and Freshwater Fisheries Division  
Fisheries Section

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## **Introduction**

The objective of the Logan Martin Reservoir management plan is to collect quantitative biological data to assist district biologists in developing management strategies to enhance the fishery. The reservoir is sampled periodically to follow trends in growth, recruitment, and mortality, of its major sport fish species. Logan Martin Reservoir has previously been sampled in 1986, 1988, 1994, 2000 and 2002 by District II Fisheries personnel and in 1993 by Auburn University Fisheries personnel.

Detailed characteristics of Logan Martin Reservoir can be found in the 1986-management report (Catchings and Cook 1987). A summary of morphometric, physical, and chemical characteristics is listed in Table 1 of this report.

## **Methods**

Logan Martin Reservoir was sampled in the fall of 2004 according to guidelines of the Fisheries Section's Reservoir Management Manual (Cook 1999). Trap netting for crappie was conducted October 20-22, 2004; and gill netting for *Morone* species was conducted November 9-11, 2004. Detailed descriptions of gear and methods of deployment can be found in the 2000 management report (Catchings and Smith 2000). Netting sites are shown in Figure 1.

In addition to fish sampling, a General Reconnaissance Survey was conducted to evaluate angler success, determine the need for additional facilities, report public relation problems, and describe commercial fisheries.

All tables and figures are located in Appendix A. These should be reviewed carefully because all information provided may not be cited specifically within report text.

## **Results**

Fall trap netting resulted in the capture of 113 black crappie in 2004 (Tables 3 and 4). Stock-trophy catch-per-effort (CPE) exceeded the mean (2.4) for upland reservoirs (Table 4, Jim McHugh, unpublished data). CPE of quality-size fish exceeded the 75<sup>th</sup> percentile of 1.2 while preferred-size CPE exceeded the upland mean of 0.6 and memorable-size CPE was at the lower 25<sup>th</sup> percentile of 0.1 (Table 4, Jim McHugh, unpublished data).

Quality-size black crappie numbers were dominant (Table 4, Figure 2) as RSD-Q surpassed the upland reservoir 75<sup>th</sup> percentile for the second consecutive sample (Figure 2, Jim McHugh, unpublished data). Preferred-size crappie RSD increased 133% from 2002 to a level slightly above the average for upland reservoirs in Alabama (Table 4, Figure 2, Jim McHugh, unpublished data). Concurrently, memorable-size crappie RSD was slightly below the 25<sup>th</sup> percentile (Table 4, Figure 2).

Growth, expressed as mean length-at-age, for ages 1+ and 2+ black crappie remained consistent with the 2002 sample from Logan Martin Reservoir (Table 5, Catchings and Andress 2002 unpublished data). Age 3+ growth decreased 15% from 309 mm in 2002 to 264 mm (Table 5, Catchings and Andress 2002 unpublished data).

The current crappie fishery is sustained by the 2003 and 2001 year-classes. The 2003-year class was moderately strong as age 1+ black crappie accounted for 61% of the sample and ranged in size from 110 to 280 mm TL (Tables 5 and 6, Figure 3). Age 3+ fish accounting for 37% of the sample (Table 5). No young-of-year crappie were sampled. Hopefully the alternating cycle of strong/poor year classes will persist and 2005 will have at least a moderately strong year class.

Wr values exceeded the upland mean for quality and preferred-size black crappie, and exceeded the lower 25<sup>th</sup> percentile for memorable-size fish (Table 4, Figure 4, Jim McHugh, unpublished data). Mortality could not be determined as outlined in the Reservoir Manual.

Fall gill netting inadvertently captured 89 black crappie (Table 3). Unfortunately, crappie have not been represented as heavily in previous gill net samples so no comparisons can be made presently. Gill net sampled crappie CPE, RSD, and Wr data is provided in Table 4, and length at age information is provided in Tables 7 & 8 and Figure 5.

Fall gill netting for target species resulted in the capture of 16 striped bass and 23 hybrid striped bass (Tables 3 and 9). Striped bass stock-size CPE (0.8) and quality-size CPE (0.5) continue to decline despite increased numbers stocked/acre in 2003 and 2004 (Tables 9 and 2, respectively). Sixty three percent of the striped bass were age 1+ fish from the 2003 year-class (Table 10). RSD for stock-size stripers was 63% and quality-size was 38% (Table 9, Figure 6). Both stock and quality Wr values dropped from 2002, but still indicated that the striped bass were in decent condition (Table 9, Figure 6). Stripers were achieving a mean-length of 431 mm at age 1+ (Tables 10 and 11, Figure 7).

Hybrid striped bass were captured at the rate of 2 fish/net night with 43.5% of the fish being from the 2004-year class and 39.1% from the 2003 year-class (Table 12). Preferred-size hybrids remain dominant (48%), as in 2002 and 1999 (Table 9, Figure 8). However, 2004 data revealed a 64% decline in RSD of memorable-size hybrid striped bass and a 212% increase in the RSD of stock-size hybrid striped bass from the 2002 sample (Table 9, Figure 8). Relative weight values were up for quality-size hybrid striped bass and although values dropped slightly for stock and memorable hybrid striped size groups, they remained at 90 or greater indicating excellent condition (Table 9, Figure 8). The only dramatic drop in condition was the 12% decrease in preferred-size fish Wr (Table 9, Figure 8). Hybrids were achieving a mean-length of 448 mm at age 1+ (Tables 12 and 13, Figure 9).

## **Conclusions**

Crappie fishing should be good in 2005 and 2006 as the 2001 and 2003 year-classes continue to grow. The fishery in 2007 will be dependent upon the strength and recruitment of the 2005 year-class.

The striped bass and hybrid striped bass fishery may experience a decline as catch rates were down for the second consecutive sample. The striped bass fishery fluctuates depending upon 1) reproduction and migration of the striped bass down the Coosa from Weiss Reservoir as documented by Smith and Catchings 1998 and 2) stocking success into Logan Martin. Striped bass and hybrid striped bass will continue to be stocked at 3-5 fish per acre to maintain the fishery.

The tailwater fishery below Neely Henry Dam is heavily utilized. Angler success in the tailwater area is high for catfish, striped bass, hybrid striped bass and white bass.

There are currently no new issues concerning public relations, accessibility, or aquatic weed nuisances pertaining to Logan Martin Reservoir that require attention at this time. However, it is worth mentioning that a no consumption advisory remains in effect for striped bass, crappie and catfish over 1 pound from Logan Martin Reservoir. For the latest consumption advisory information, check the department of public health website: [www.adph.org](http://www.adph.org).

### **Literature Cited**

Catchings, E. D. and J. D. Cook, 1987. Logan Martin reservoir management report. Alabama Game and Fish Division, Montgomery.

Catchings, E. D. and S. M. Smith 2000. Logan Martin reservoir management report. Division of Wildlife and Freshwater Fisheries, Montgomery.

Cook, S. F. 1999. Reservoir management manual. Alabama Game and Fish Division, Montgomery.

Ryder, R.A. 1965. A method for estimating the potential fish production of North American temperate lakes. Transactions of the American Fisheries Society. 94:214-218.

Smith, S. M. and E.D.Catchings. 1998. Food habits and natural reproduction of striped bass in Weiss Reservoir, Alabama. A final report for statewide fisheries research project F-43-I-12. Alabama Game and Fish Division, Montgomery.

# **Appendix A**

## **Tables and Figures**

Table 1. Logan Martin Reservoir morphometric, physical,  
and chemical characteristics.

Surface area	15,263 acres
Drainage area	7,700 sq. mi.
Full pool elevation	465 feet-msl
Mean annual fluctuation	5 feet
Shoreline distance	275 miles
Shoreline development index	15.9
Mean depth	18 feet
Maximum depth	69 feet
Outlet depth	450 feet (upper) 401 feet (lower)
Total dissolved solids (TDS)	109 mg/l
Morphoedaphic index	6.05 TDS/mean depth(ft) (Ryder 1965)
Growing season	210 frost free days
Year of impoundment	1964



Table 2. Fish stocking in Logan Martin Reservoir, 1993-2004.

Species	Year	No/Ac	Size (in)	Total	
Hybrid Striped Bass	1993	2.0/A	1-2	30745	
	1994	3.0/A	1-2	45916	
	1995	3.0/A	1-2	45789	
	1996	4.0/A	1-2	61310	
	1998	3.1/A	1-2	47464	
	1999	3.0/A	1-2	45873	
	2000	3.0/A	1-2	46117	
	2001	5.0/A	1-2	76309	
	2002	3.0/A	1-2	45800	
	2003	7.2/A	1-2	109435	
	2004	5.0/A	1-2	77000	
Total				631758	
Striped Bass	1993	5.3/A	1-2	80798	G
	1994	1.3/A	1-2	19791	G
	1995	5.0/A	1-2	76351	G
	1996	5.0/A	1-2	76255	G
	1998	3.0/A	1-2	46009	G
	1999	2.2/A	1-2	33932	A
	2000	0	0	0	
	2001	2.6/A	1-2	40120	A
	2002	3.0/A	1-2	45936	G
	2003	5.0/A	1-2	76567	G
	2004	5.0/A	1-2	75850	G
Total				571609	

\* G denotes gulf coast strain

\* A denotes Atlantic strain

Table 3. Number of species collected by gear type from  
Logan Martin Reservoir, fall 2004.

Species	Gill Net			Trap Net		
	No.	CPE	Tot E	No.	CPE	Tot E
White Crappie	4	0.3	12	4	0.1	40
Black Crappie	89	7.4	12	113	2.8	40
Striped Bass	16	1.3	12			
Hybrid striped bass	23	2.0	12			
White bass	5	0.4	12			

Table 4. Relative stock density, catch per effort, and relative weight of black crappie in Logan Martin Reservoir, 1999, 2002, and 2004 fall samples.

			SUBSTOCK				RSD-S				RSD-Q				RSD-P				RSD-M				RSD-T				TOTAL		
			No. of																										
Species	Gear		samples	No.	CPE	Pct.*	No.	CPE	Pct.	Wr	No.	CPE	Pct.	Wr	No.	CPE	Pct.	Wr	No.	CPE	Pct.	Wr	No.	CPE	Pct.	Wr	No.	CPE	
Black Crappie	1999	Trap Net	30	8	0.3	6.0	9	0.3	7.0	68	44	1.5	33.0	85	77	2.6	58.0	92	3	0.1	2.0	90					141	4.7	
	2002	Trap Net	44	4	0.1	2.9	6	0.1	4.3	90	89	2.0	63.9	98	18	0.4	12.9	96	27	0.6	19.3	95					144	3.3	
	2004	Trap Net	40	1	0.0	1					76	1.9	68	92	33	0.8	30	94	3	0.1	3	96					113	2.8	
LAKE AVERAGE					0.1	3.3		0.1	3.8	52.7		1.8	55.0	91.7		1.3	33.6	94.0		0.3	8.1	93.7						3.6	
Black Crappie	2004	Gill Net	12	0	0.0	0	3	0.3	3	81	20	1.7	22	93	25	2.1	28	95	39	3.3	44	97	2.0	0.2	2	104	89	7.4	

\*Substock Pct. is substock ratio: number of substock size fish collected for every 100 fish of stock size and larger.

Table 5. Age composition and mean length of black crappie collected from Logan Martin Reservoir, fall 2004 trap nets.

Annulus	Year	Number	Percent	CPE	Mean	
	Class				Length	(SE)
1+	2003	69	61.1	1.7	225.1	2.3
2+	2002	2	1.8	0.1	262.0	4.0
3+	2001	42	37.2	1.1	263.9	3.8
Totals		113	100.1	2.9		

Table 6. Length at age of black crappie collected from  
Logan Martin Reservoir, fall 2004 trap nets.

Length (mm)	I	II	III	Totals
110	1			1
120				
130				
140				
150				
160				
170				
180				
190				
200	5		1	6
210	15		1	16
220	20		2	22
230	21		4	25
240	5		2	7
250	1	1	5	7
260		1	8	9
270			7	7
280	1		4	5
290			5	5
300			3	3
Totals	69	2	42	113

Table 7. Age composition and mean length of black crappie collected from Logan Martin Reservoir, fall 2004 gill net samples.

Annulus	Year Class	Number	Percent	CPE	Mean Length	(SE)
1+	2003	9	10.1	0.8	218.2	5.9
2+	2002	10	11.2	0.8	218.3	5.8
3+	2001	44	49.4	3.7	284.5	4.3
4+	2000	10	11.2	0.8	335.3	7.1
5+	1999	4	4.5	0.3	351.5	13.1
6+	1998	2	2.2	0.2	351.5	30.5
7+	1997	2	2.2	0.2	328.5	26.5
8+	1996	4	4.5	0.3	360.0	11.0
9+	1995	1	1.1	0.1	360.0	
11+	1993	3	3.4	0.3	364.3	9.9
Totals		89	100.0	7.4		

Table 8. Length at age of black crappie collected from Logan Martin Reservoir, fall 2004 gill net samples.

Length (mm)	I	II	III	IV	V	VI	VII	VIII	IX	XI	Totals
170	1	1									2
180											0
190			1								1
200											0
210	2	2									4
220	4	4									8
230	2	3	1								6
240			2								2
250			6								6
260			3								3
270			3								3
280			5								5
290			7	1							8
300			8				1				9
310			5	1	1						7
320			1	2		1					4
330			2	2				1			5
340				2						1	3
350				1	2		1				4
360								2	1		3
370				1	1					2	4
380						1		1			2
Totals	9	10	44	10	4	2	2	4	1	3	89

Table 9. Relative stock density, catch per effort, and relative weight of striped and hybrid striped bass in Logan Martin Reservoir, 1999, 2002 & 2004.

			SUBSTOCK				RSD-S				RSD-Q				RSD-P				RSD-M				RSD-T				TOTAL	
Species	Gear	No. of samples	No.	CPE	Pct.*	No.	CPE	Pct.	Wr	No.	CPE	Pct.	Wr	No.	CPE	Pct.	Wr	No.	CPE	Pct.	Wr	No.	CPE	Pct.	Wr	No.	CPE	
Striped Bass	1999	Gill Net	10	5	0.5	4.6	94	9.4	87.8	87	13	1.3	12.2	86													112	11.2
	2002	Gill Net	12	4	0.33	14	21	1.8	72	102	8	0.7	28	90													33	2.8
	2004	Gill Net	12				10	0.8	63	93	6	0.5	38	86													16	1.3
	LAKE AVERAGE				0.4	9.3		4	74.3	94		0.8	26.1	87.3														5.1
Hybrid Striped Bass	1999	Gill Net	10	1	0.1	1.2	3	0.3	3.8	94	3	0.3	3.8	90	58	5.8	74.3	101	13	1.3	16.6	109	1	0.1	1.2	74	79	7.9
	2002	Gill Net	12				4	0.3	12.5	91	1	0.1	3.1	86	19	1.6	59.4	94	8	0.7	25	94					32	2.7
	2004	Gill Net	12				9	0.8	39	90	1	0.1	4	93	11	0.9	48	83	2	0.2	9	90					23	2.0
	LAKE AVERAGE							0.5	18.4	91.6		0.2	3.6	89.7		2.8	60.6	92.7		0.7	16.9	97.7						4.2

\*Substock Pct. is substock ratio: number of substock size fish collected for every 100 fish of stock size and larger.



Table 10. Age composition and mean length at capture of striped bass  
from Logan Martin Reservoir, fall 2004 gill net samples.

Annulus	Year Class	Number	Percent	CPE	Mean Length	(SE)
1+	2003	10	62.5	0.8	430.9	7.8
2+	2002	6	37.5	0.5	557.0	16.5
Totals		16	100.0	1.3		

Table 11. Length at age of striped bass collected from  
Logan Martin Reservoir, fall 2004 gill net samples.

Length (mm)	I+	II+	Totals
375	1		1
400	4		4
425	2		2
450	3		3
475			0
500		1	1
525		1	1
550		3	3
575			0
600			0
625		1	1
Totals	10	6	16

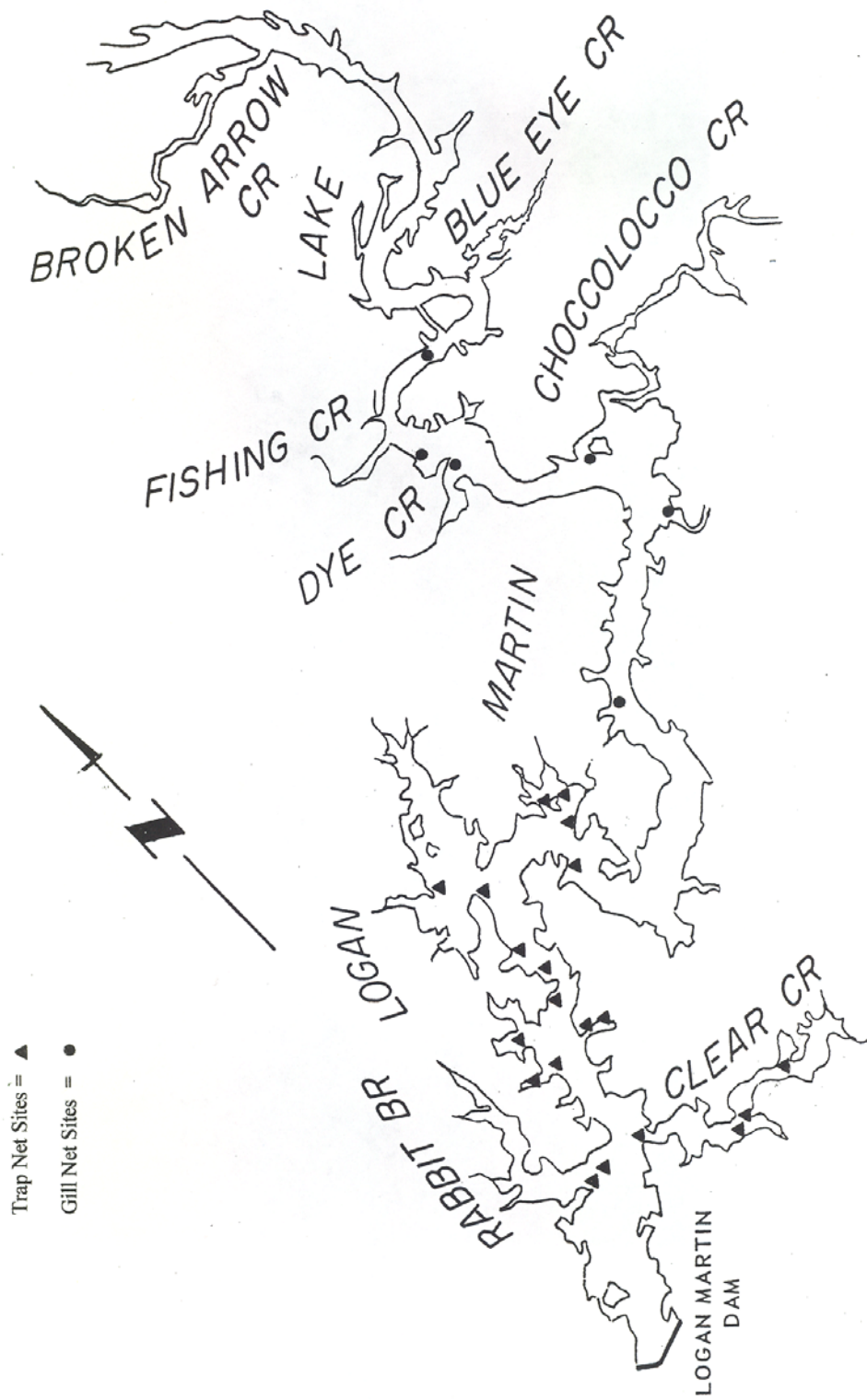
Table 12. Age composition and mean length at capture of hybrid striped bass  
from Logan Martin Reservoir, fall 2004 gill net samples.

Annulus	Year		Number	Percent	CPE	Mean TL	(SE)
	Class						
0+	2004	10	43.5	0.8	283.6	5.2	
1+	2003	9	39.1	0.8	448.3	8.0	
2+	2002	3	13.0	0.3	497.7	39.4	
4+	2000	1	4.3	0.1	594.0		
Totals		23	100.0	1.9			

Table 13. Length at age of hybrid striped bass collected  
from Logan Martin Reservoir, fall 2004 gill net samples.

Length (mm)	0+	I+	II+	IV+	Total
225	1				1
250					
275	8				8
300	1				1
325					
350					
375					
400		2			2
425		2	1		3
450		3	1		4
475		2			2
500					
525					
550					
575			1	1	2
Totals	10	9	3	1	23

Figure 1. Logan Martin Reservoir Fall 2004 Sampling Sites





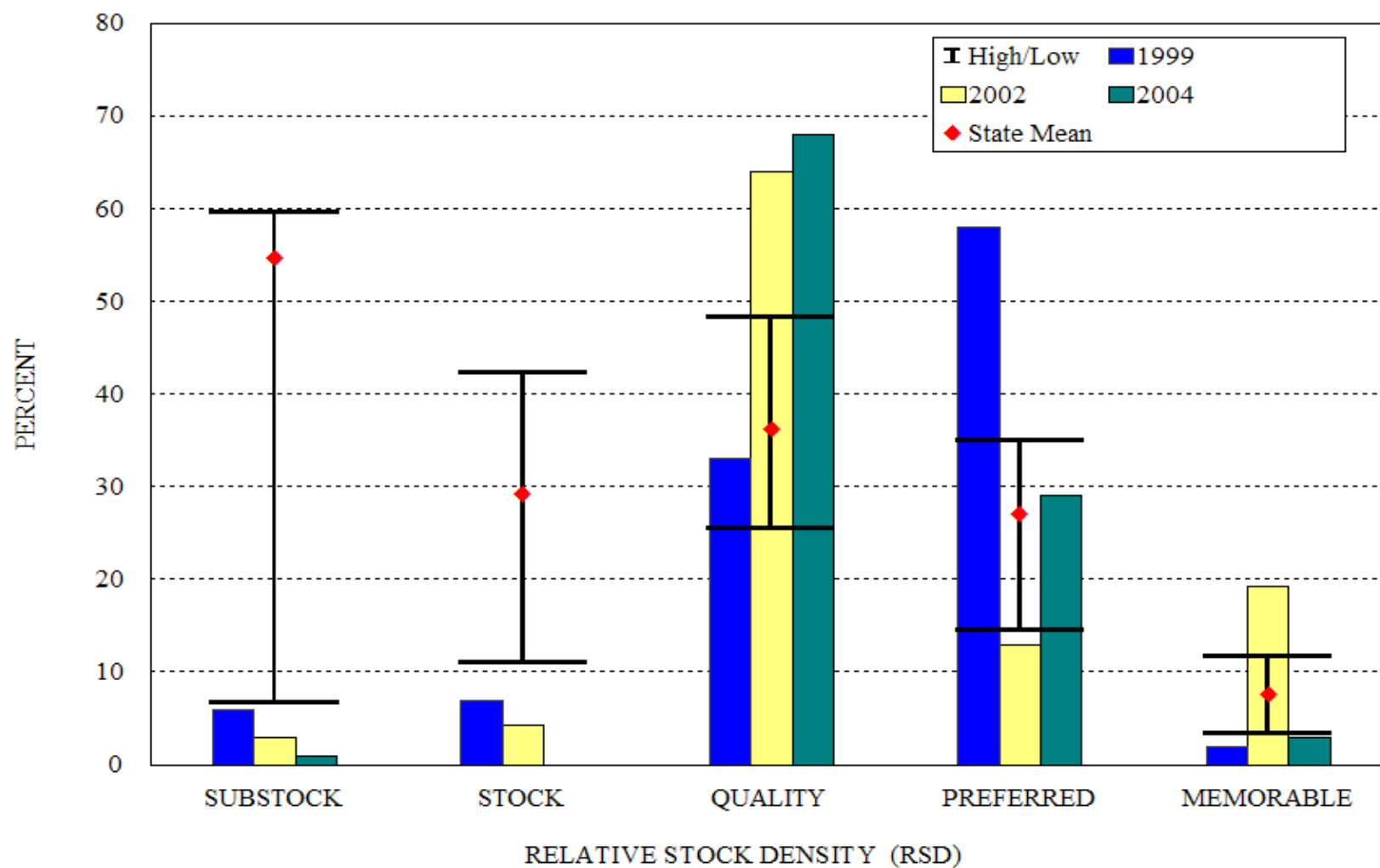


Figure 2. Relative stock density (RSD) of black crappie from Logan Martin Reservoir, fall 1999, 2002 and 2004 trap net samples. The I-beam denotes the 25-75th percentile values of black crappie for upland reservoirs (above fall line) in Alabama.





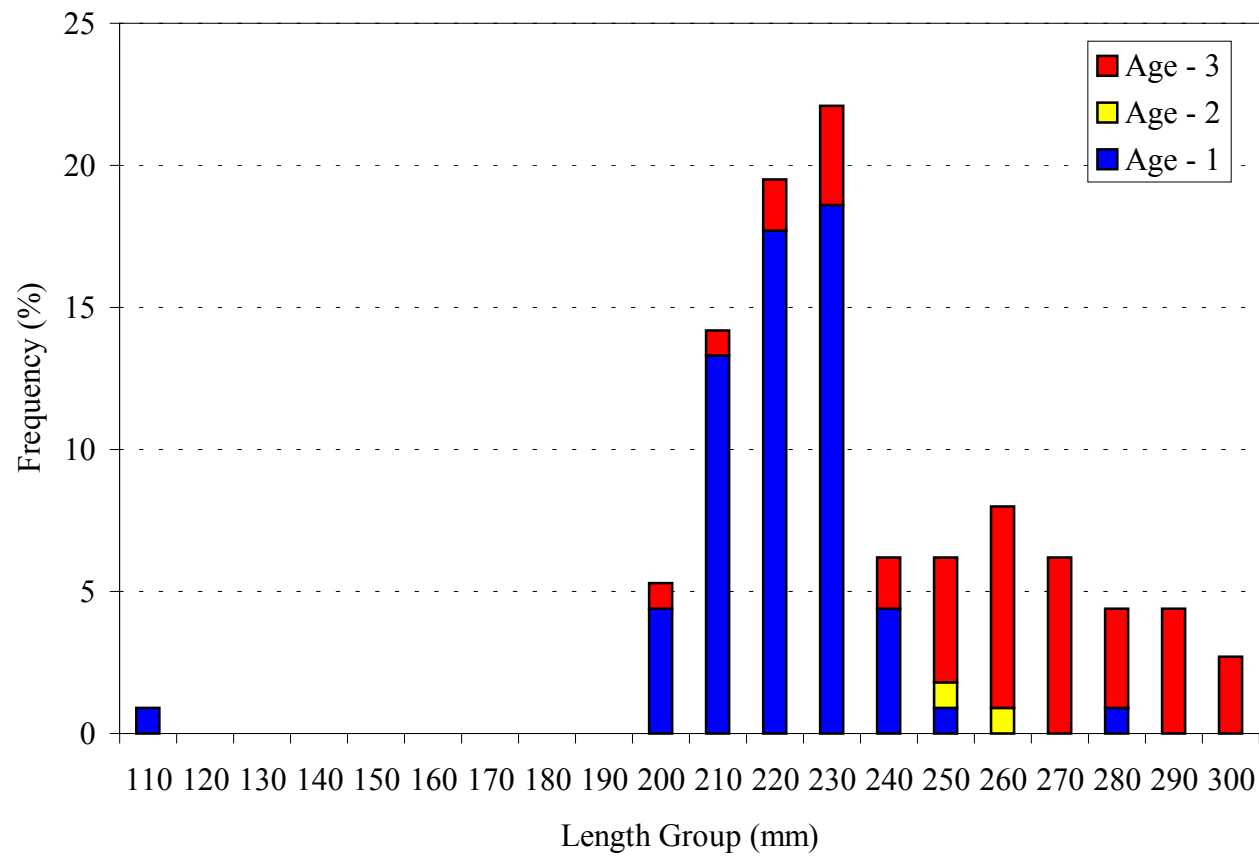


Figure 3. Black crappie (N=113) length-at-age frequency from Logan Martin Reservoir, fall 2004 trapnet samples.

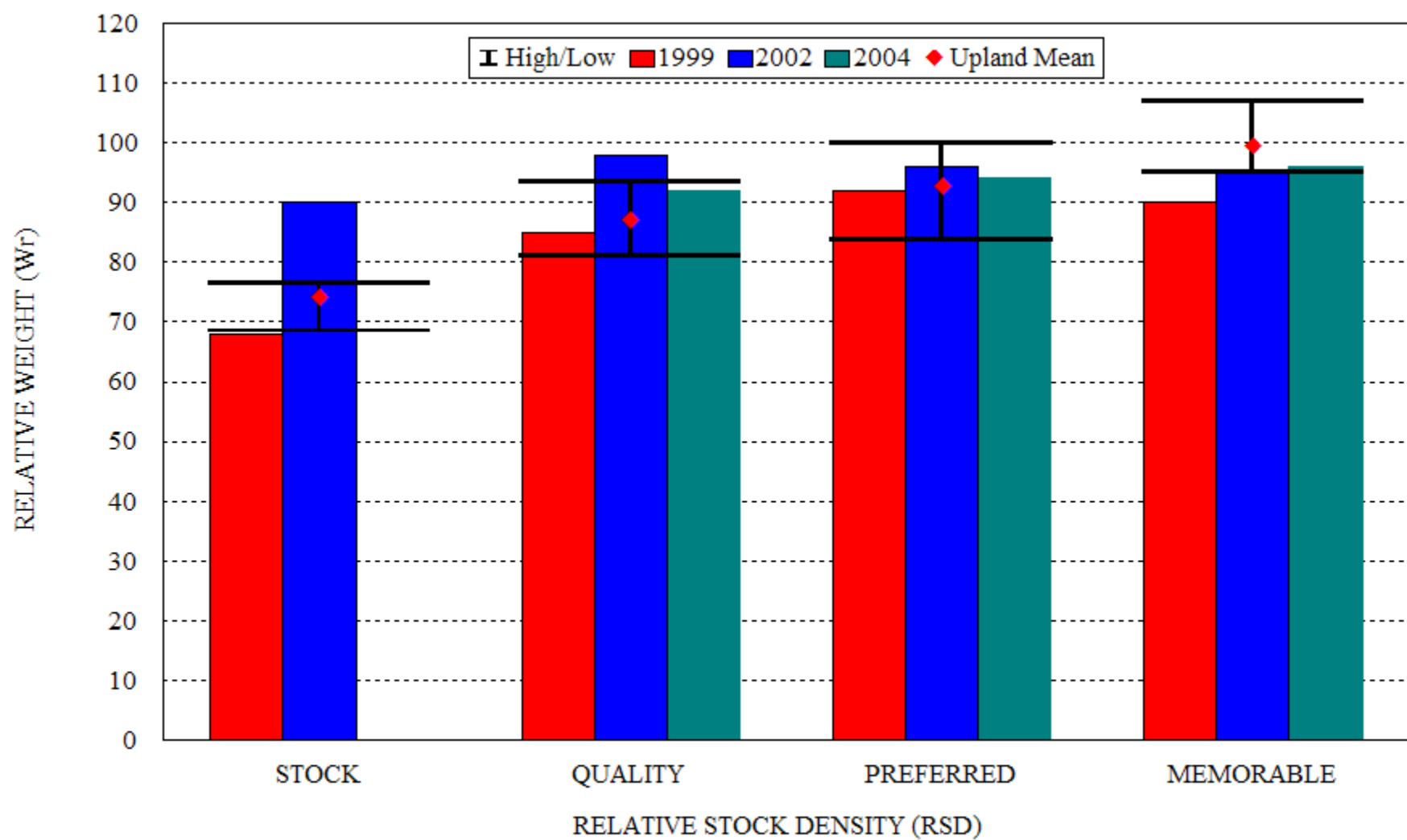


Figure 4. Relative weight from black crappie at Logan Martin Reservoir, fall 1999, 2002 and 2004 trap net samples. The I-beam denotes the 25-75th percentile values of black crappie in upland reservoirs (above fall line) in Alabama.

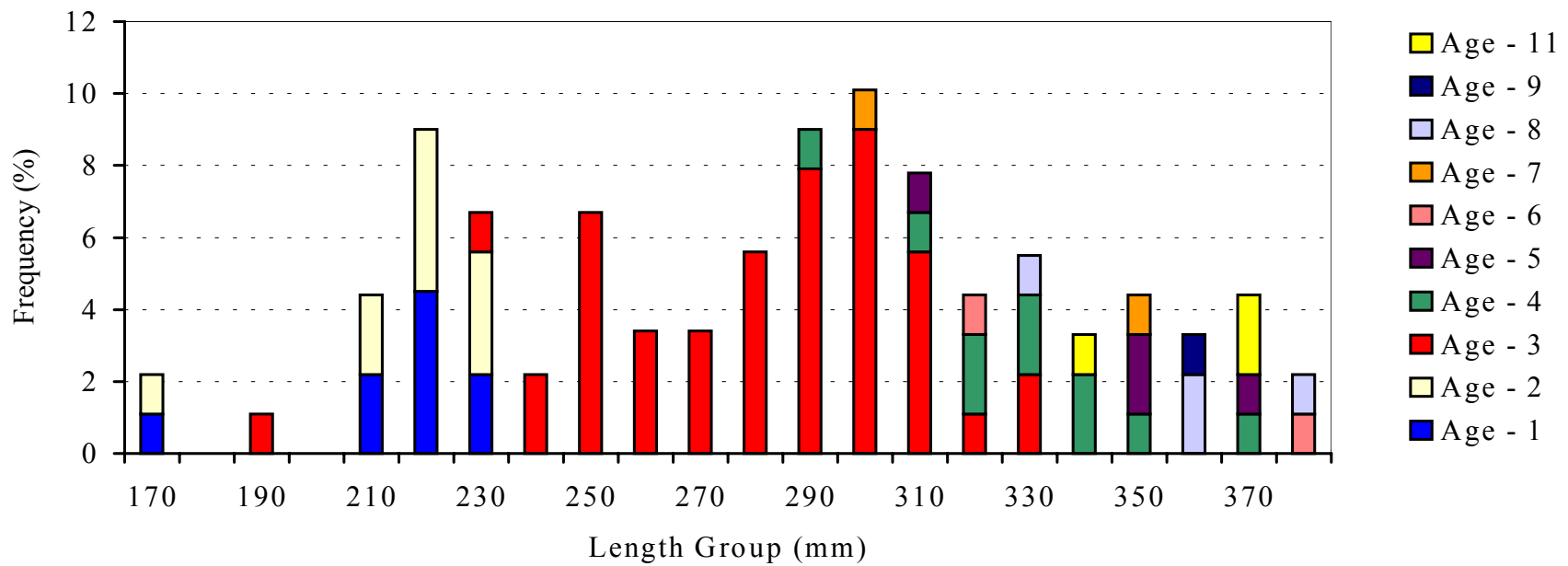


Figure 5. Black crappie (N=89) length-at-age frequency from Logan Martin Reservoir, fall 2004 gill net samples.

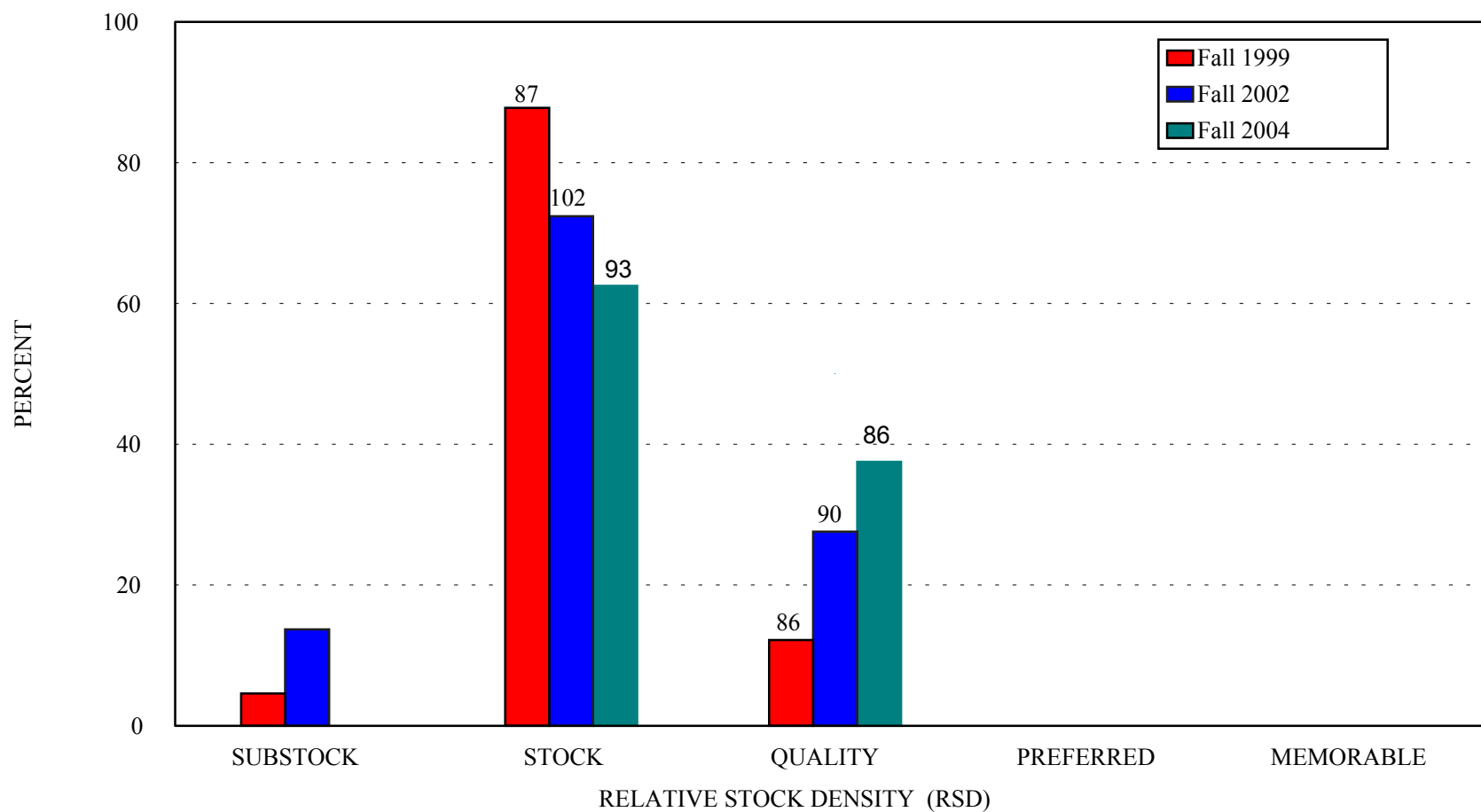


Figure 6. Relative stock density (RSD) of striped bass from Logan Martin Reservoir, fall 1999, 2002 and 2004. Relative weight (Wr) values are shown above columns.

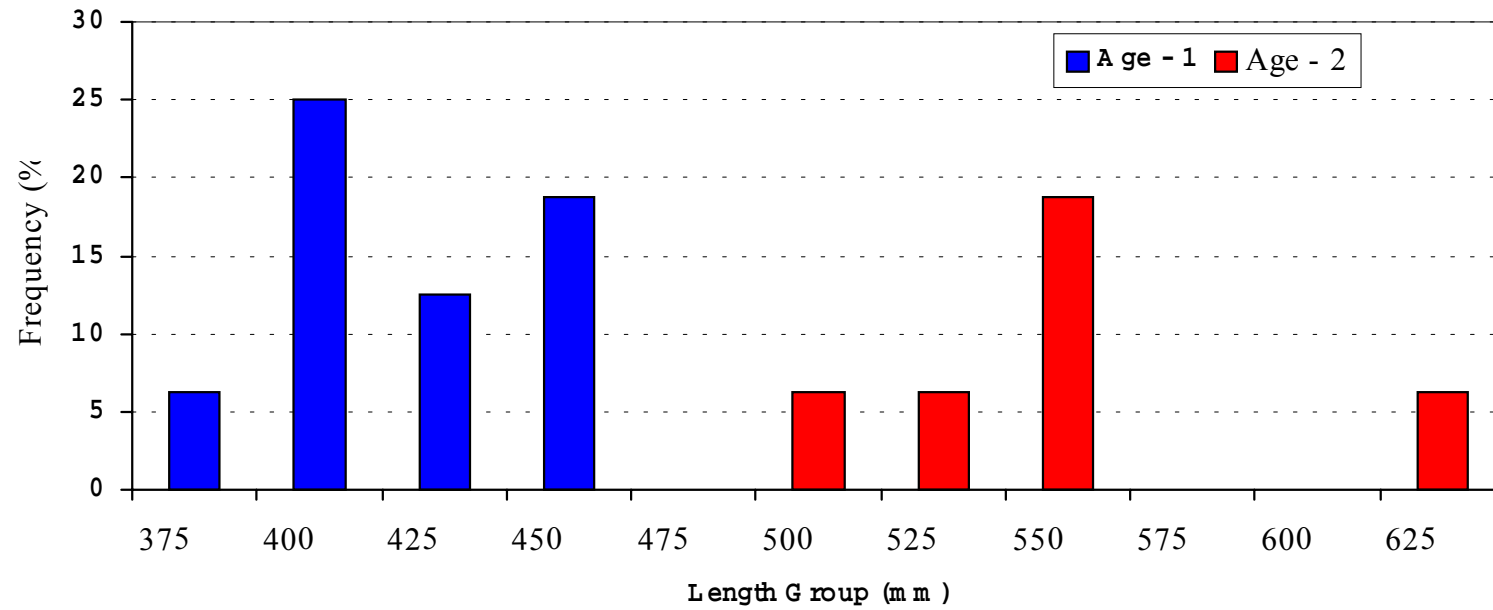


Figure 7. Striped Bass (N=16) length-at-age frequency from Logan Martin Reservoir, fall 2004.

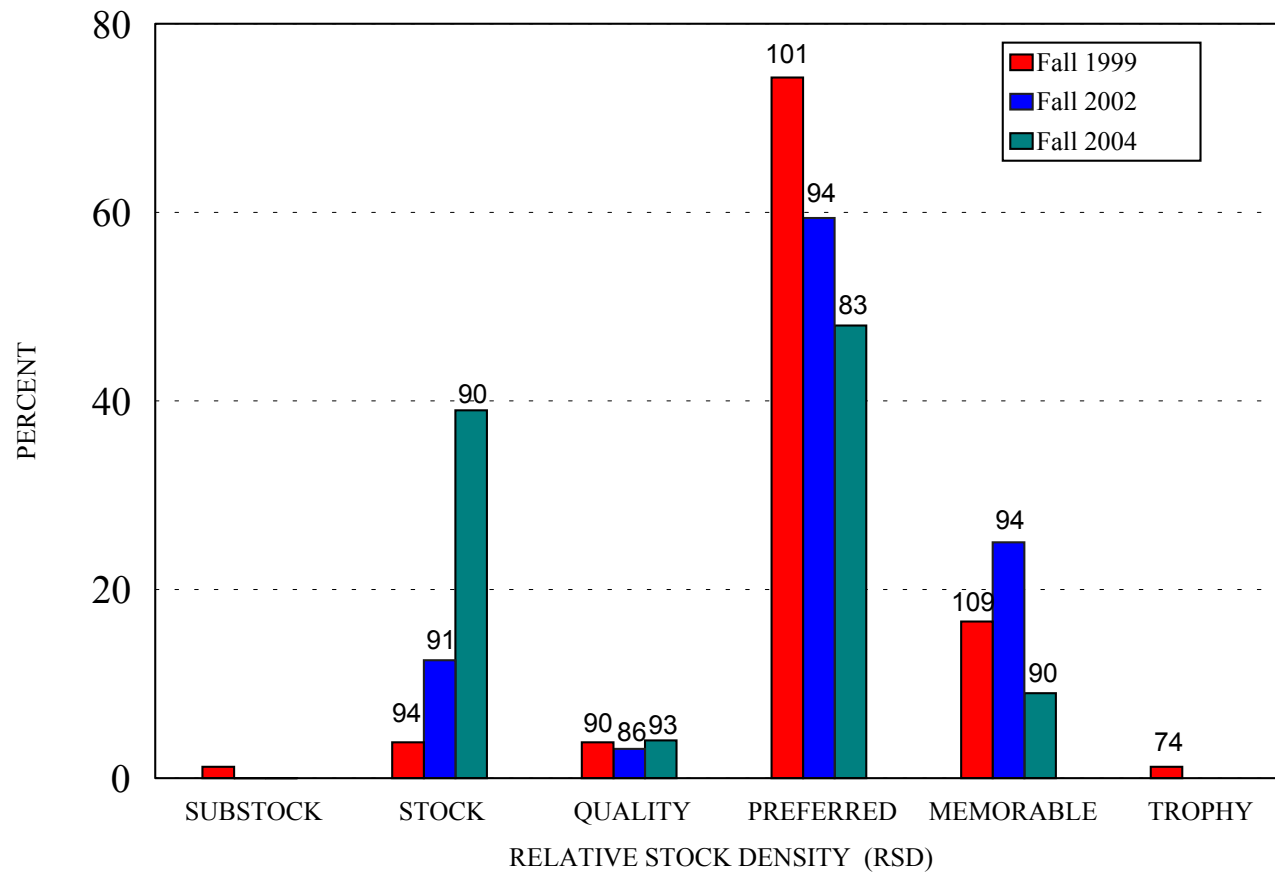


Figure 8. Relative stock density (RSD) of hybrid striped bass from Logan Martin Reservoir, fall 1999, 2002 and 2004. Relative weight (Wr) values are shown above columns.

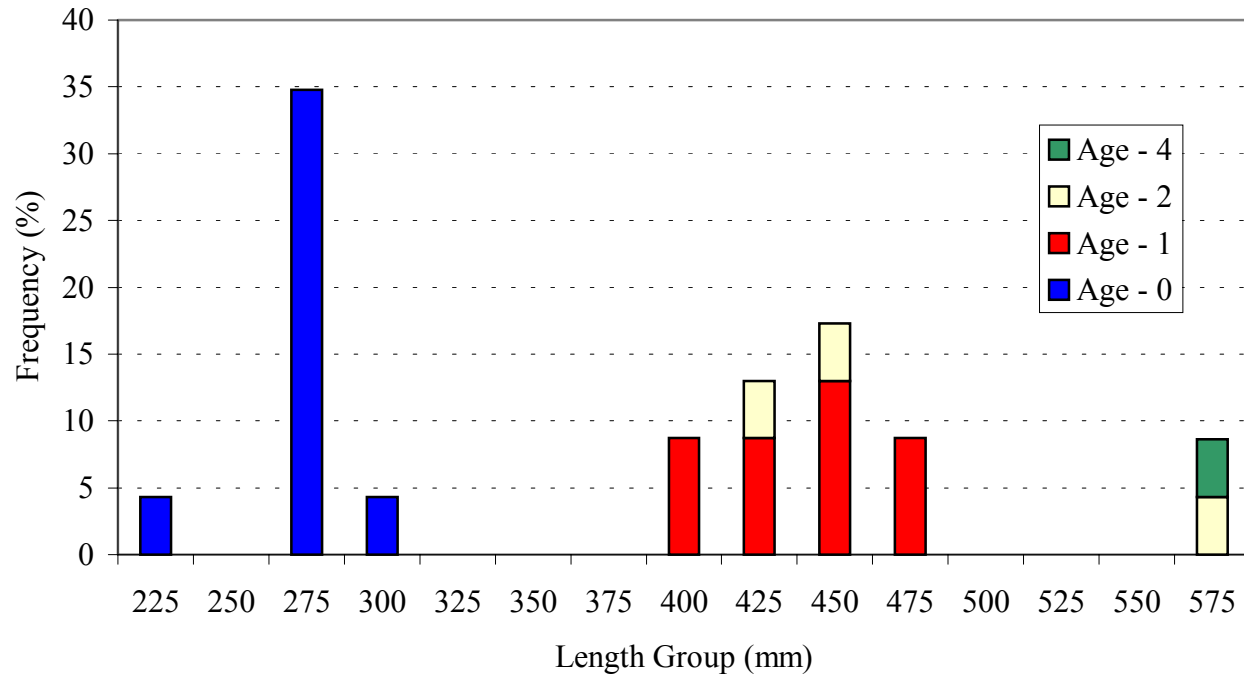


Figure 9. Hybrid Striped Bass (N=23) length-at-age frequency from Logan Martin Reservoir, fall 2004.